Wireless LAN PC Card

User's Manual

Ver 1.4

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device will accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference Statement

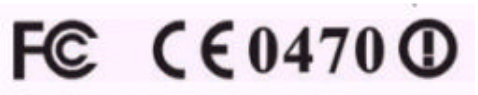
This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user need to correct the interference at his area. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Plug the equipment into an outlet that is on a different circuit from the television or radio.
- Change the direction of the television or radio antenna until the interference disappears.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.

To assure continued compliance, any changes or modifications not expressly approved by manufacturer could void the user' s authority to operate the equipment.

FCC Radiation Exposure Statement

This device and its antennas must operate with a separation distance of at least 5 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End users must be provided with specific operating instructions for satisfying RF exposure compliance.



This product has been certified in France, Germany, Italy, Spain, Sweden, UK, and US.

LIMITED WARRANTY

This product is warranted by manufacturer to be free from defects in material and workmanship for one (1) year from the date of purchase, unless otherwise stated.

During this period if this product is found to be defective in material or workmanship, manufacturer or one of its authorized service facilities will at its option either repair or replace this product without charge, subject to the following conditions, limitations and exclusions:

1. This warranty extends to the original consumer purchaser only and is not assignable or transferable.
2. This warranty shall not apply to any product which has been subjected to misuse, abuse, abnormal use, negligence, alteration or accident, or has had its serial number altered or removed.
3. This warranty does not apply to any defects or damage directly or indirectly caused by or resulting from the use of unauthorized replacement parts and/or service performed by unauthorized personnel.
4. This warranty does not apply to the software driver that accompanies this product.

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1. INTRODUCTION

Wireless LAN is local area networking without wires, which uses radio frequencies to transmit and receive data between PC' s or other network devices. Wireless LAN is able to configure independent networks and infrastructure networks. The former is suitable for small or temporary peer-to-peer configurations, and the later is offering fully distributed data connectivity via micro cells and roaming.

The WLAN PC Card is designed to meet the mobility, performance, security, interoperability, management, and reliability requirements of IEEE 802.11b high data rate standard. It is easy to install the WLAN PC Card on various devices with PCMCIA TYPE II card slot. It is able to communicate with other IEEE 802.11b compatible products to create a wireless LAN in your office or home.

1.1 Features

- Compliant with 11 Mbps 802.11b high-speed specification.
- Data rate 11/5.5/2/1 Mbps automatic fallback under noisy environment.
- Advanced Power Management for battery saving.
- Build PCB patch diversity antennas.
- Supports MS Windows 95/98/ME/NT/2000/XP/CE, and Linux.
- Interoperable with IEEE 802.11b compliant equipment.
- Supports full mobility and seamless roaming from cell to cell.
- Plug-and-play installation and easy client management with utility software
- Supports point-to-point and point-to-multipoint access.
- Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and secure wireless connection.
- Wireless connection without the hassles and cost of cabling.
- Greater flexibility to locate or move networked PC' s.

1.2 Applications

- Home networking for device sharing - Remote access to corporate network information email, file transfer and terminal emulation.
- Frequently changing environments - Retailers, manufacturers and banks that frequently rearrange the workplace and change location.
- SOHO (Small Office and Home Office) users - SOHO users need easy and quick installation of a small computer network functions.
- Inter-building connection - The wireless building-to-building network installs quickly, requires no monthly lease fees, and provides the flexibility to reconfigure easily.
- Typical applications include hard-to-wire buildings, campuses, hospitals/medical offices, warehouse, security huts, exhibition centers, etc.
- Temporary LANs for special projects or occasions - Auditors require workgroups at customer sites. Trade shows, exhibitions, retailers, airline, and shipping companies need additional workstations for a peak period of data traffic.

1.3 Wireless LAN System

1.3.1 802.11 Ad-Hoc Configuration

An 802.11 Ad-Hoc wireless LAN is a group of computers, each equipped with one WLAN PC Card, connected as an independent wireless LAN. Computers in a specific 802.11 Ad-Hoc wireless LAN must be configured at the same radio channel. 802.11 Ad-Hoc wireless LAN is applicable to a departmental scale for a branch or SOHO operation.

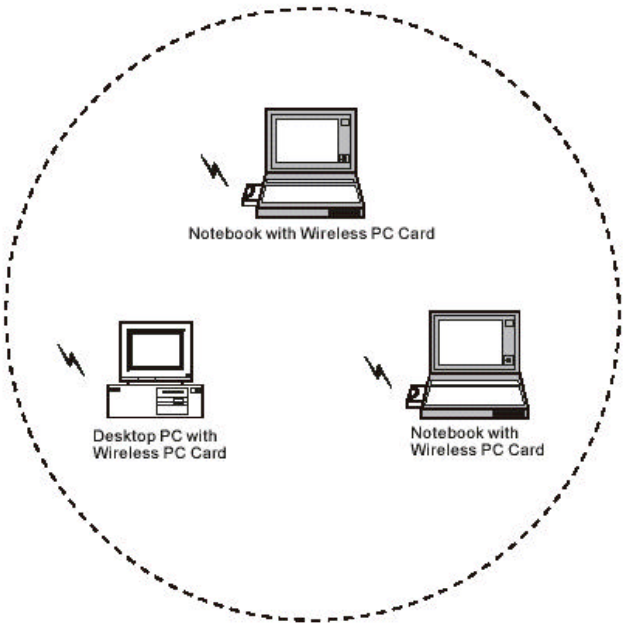

Figure 1-1 802.11 Ad-Hoc Configuration

1.3.2 Infrastructure Configuration

An integrated wireless and wired LAN is called an infrastructure configuration. A group of WLAN PC Cards and an Access Point (AP) is called a Basic Service Set (BSS). Each WLAN PC Card in this BSS can be linked to any computer in the wired LAN infrastructure via the AP.

Infrastructure configuration not only extends the accessibility of a WLAN PC Card to the wired LAN, but also doubles the effective wireless transmission range between two WLAN PC Cards.

BSS ID is, in essential, the ID of each independent WLAN PC Card. All WLAN PC Cards configured without roaming options in this independent BSS must be configured with BSS ID of that AP. You may need to check BSS ID of your AP by using its vendor supplied program.

Infrastructure configuration is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

Two APs can be used as a point-to-point link between two LANs. LAN interconnection is applicable to a wireless backbone between buildings.

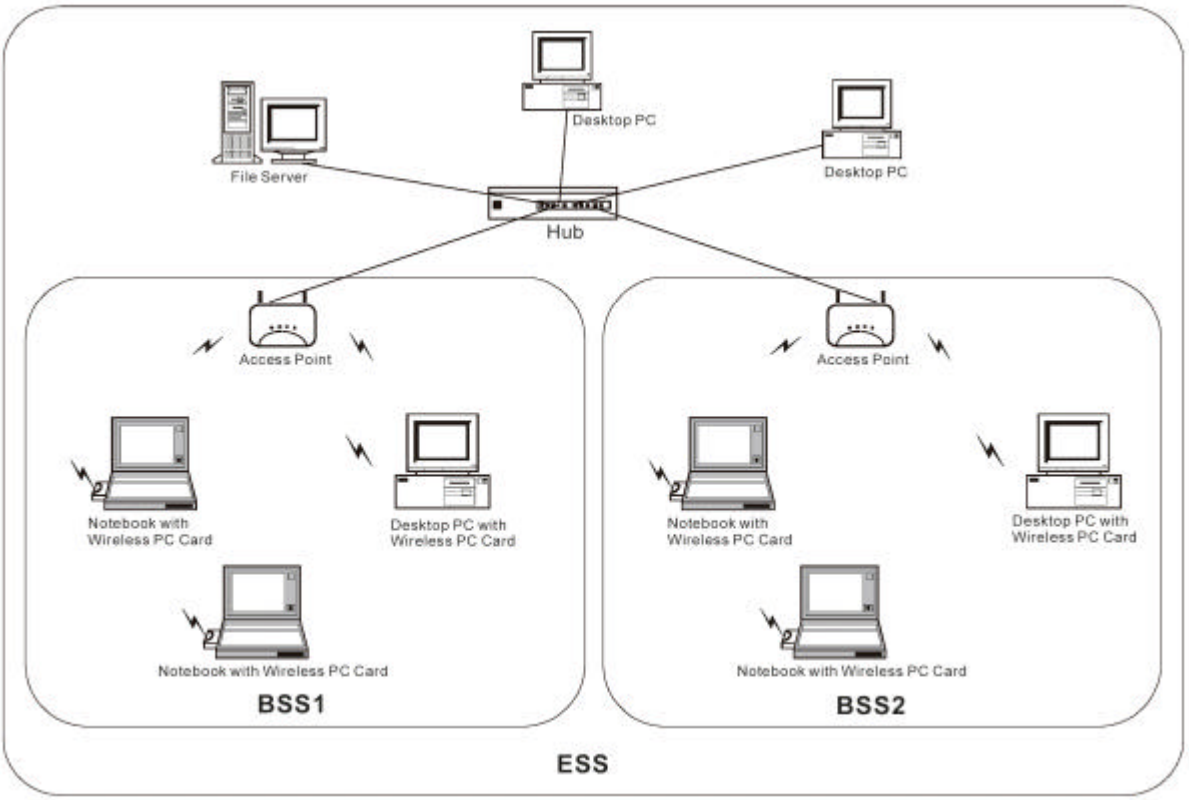

Figure 1-2 Infrastructure Configuration

The infrastructure configuration supports roaming capability for mobile workers. More than one BSS can be jointly configured as an Extended Service Set (ESS). On account of a continuous connection to the network, users within this ESS can roam freely. All WLAN PC Cards and APs within one ESS must be configured with the same ESS ID.

Before setting up an ESS for roaming, it would be helpful to achieve good performance by choosing a feasible radio channel and right places for APs.

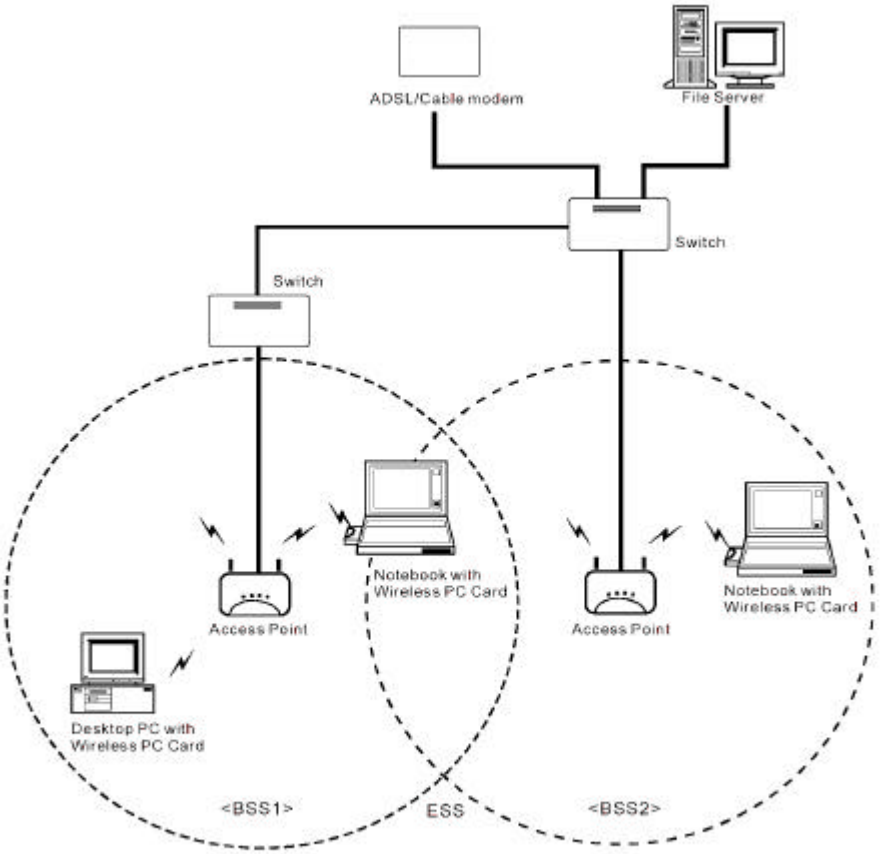

Figure 1-3 Seamless Roaming

2. INSTALLATION

Use the procedures described in this chapter to install your WLAN PC Card under MS Windows 95/98/Me/NT/2000 /XP/CE, and Linux.

2.1 Product Kit

Before starting installation, please make sure the WLAN PC Card package you purchased includes the following items:

1) WLAN PC Card.
2) CD-ROM (including Driver/Utility and User's Manual).
3) Quick Start Guide.

If anything is missing, please contact your vendor.

2.2 PC's Minimum Requirements

To install the WLAN PC Card successfully, your PC (notebook, desktop, or PDA) should meet the following minimum requirements:

1) A PCMCIA slot compliant with Release 2.1 of the PCMCIA specification.
2) Windows 95, 98, Me, NT, 2000, XP, CE or Linux operating system.
3) Minimum 10 Mbytes free disk space for installing the driver and the utility program.

2.3 Installing the Utility and Driver

Depending on the operating system you use, please select one of the sections (2.3.1~2.3.4) and follow the steps to install the Utility and Driver. Then go to Section 3 to continue the procedure.

Note: Please do not plug your WLAN PC Card until the setup procedure has been completed.

2.3.1 Under MS Windows 95/98/Me/2000/XP

Please follow the steps below to install the utility and driver.

1) Insert the supplied CD-ROM in the CD-ROM drive.
2) The InstallShield Wizard should start automatically. If Autorun is disabled in your Windows settings, you will need to go to the Windows "Start" button, choose "Run" and type "D:\setup.exe" in the text box, where D is the drive letter of your CD-ROM drive.
3) Follow the InstallShield Wizard to install the driver and utility.
4) Reboot your PC after completing the installation process. (Recommended)
5) Plug your WLAN PC Card. The "Add New Hardware Wizard" automatically loads the driver, then a new application (the Configuration & Monitor Utility) icon will be displayed in the task bar.
6) Go to Section 3 for Configuration.

Note: In the MS Windows 2000/XP installation procedure, an extra window prompts you to select the options whether you would like to install the "Digital Signature Not Found" or not. You can safely select "YES".

2.3.2 Under MS Windows NT4.0

What You Need to Know About MS Windows NT4.0

Although Windows NT 4.0 is similar in appearance with Windows 95/98/Me, and Windows 2000, they have different philosophy when installing a new hardware. Throughout this section it is assumed that you have the basic working knowledge of Windows NT 4.0 and installing new network cards on this OS. Some specific features of Windows NT 4.0 are briefly explained in this paragraph. Unlike Windows 95/98/Me, and Windows 2000, Windows NT 4.0 does not support the "Plug & Play" and "Hot Swapping" features. In Windows NT 4.0 you need to inform the operating system about the existence of the new card in order to start installing the driver. Also, if you want to swap cards, you need to restart the PC to recognize the card.

Note: Being able to install the WLAN PC Card on to your PC running under Windows NT 4.0, you will need to log on as "Administrator". Also you will need to have at least NT Service Pack 4 installed.

Installing the Utility

Please follow the steps below to install the utility.

1) Insert the supplied CD-ROM in the CD-ROM drive.
2) The InstallShield Wizard should start automatically. If Autorun is disabled in your Windows settings, you will need to go to the Windows "Start" button, choose "Run" and type "D:\setup.exe" in the text box, where D is the drive letter of your CD-ROM drive.
3) Follow the InstallShield Wizard to install the utility.
4) Go to next step for installing the driver when completing the installation process.

Installing the Driver

Since MS Windows NT4.0 does not support "Plug & Play", you must enable the detection of PC cards by the operating system in the following steps:

1) Click Start -> Settings -> Control Panel.
2) Double-click the "Devices" icon.
3) Select "PCMCIA" from the list and click the "Startup" button.
4) Set the Startup type to "Boot" and click "OK".
5) Click "Close" on the "Devices" window, you must enable the Network support

By following the next steps to let the operating system know your new card.

1) Click Start -> Settings -> Control Panel.
2) Double-click the "Network" icon.
3) In the "Network Settings" window you will be prompted to install Windows NT Networking if networking has not been installed yet. Click "Yes" and follow the instruction on the screen. If networking has already been installed,

you will see a dialog with several tabs. Click the "Add" button in the "Adapters" tab. Windows NT Networking Setup will determine the type of network adapter card that you are going to use.

4) Locate and select the driver with the supplied CD-ROM to respond the prompt of selecting a driver.
5) During the installation, a dialog box prompts for the I/O Base and IRQ resource information. Go to Start -> Programs -> Administrative Tools -> Windows NT Diagnostics -> select the "Resources" tab -> press the "IRQ" button. Select one free IRQ from the list. Next, press the button "I/O Port" and choose an 0x20 free I/O space. Add these values into the dialog box. If at any point after the installation you want to change these values, go to the Control Panel -> Network, select the Adapters tab, press the Properties button, and fill in the new values.
6) Next Windows will start copying the files. If there is a version conflict, you should normally keep the latest version between one or more of the files that are being copied and the files in your system.
7) Restart your computer when completing the installation process.

Note: If the card is not working properly, make sure that your system has free resources that show their availability after a restart procedure.

2.3.3 Under MS Windows CE

Please follow the steps below to install the utility and driver.

1) Insert the supplied CD-ROM in the CD-ROM drive.
2) Click "Start" button, choose "Run" and type "D:\wince\setup.exe" in the text box, where D is the drive letter of your CD-ROM drive.
3) Follow the InstallShield Wizard to install the driver and utility.
4) Insert the WLAN PC card. When the PC card is installed after completing the installation process. A window that has two WIN TCP/IP options will automatically appear as shown in Figure 2-1.

Figure 2-1 A typical Screen with TCP/IP Options

5) Use the first option if you have plans to connect to an Access Point (become associated) that is connected to a network, where a DHCP Server is available, then an unique IP Address will be automatically assigned to your PC card. Select the second option and assign an unique IP Address to your PC card in any other case.
6) Go to Section 3 for Configuration.

2.3.4 Under Linux

Please follow the steps below to install the utility and driver.

1) Unpack the ATMEL_linux_drivers.tgz package (anywhere you like).

```
# tar xzvf ATMEL_linux_drivers.tgz
```

2) In the setup directory, run:

```
# make config
# make
```

to install the driver patch and the necessary files.

make sure that you logged on from root directory.

3) Enable CONFIG_NET_RADIO in the kernel to run the applications.

in /usr/src/linux

```
# make menuconfig
```

Select Network Device Support

|--->Wireless LAN (non-hamradio)

|--->Wireless LAN (non-hamradio)

4) PCMCIA NOTE

If you are installing the PCMCIA driver after the installation run :

```
#/etc/init.d/pcmcia restart
```

Note: FOR MORE DETAILS SEE THE README INSIDE THE vnetsetup PACKAGE

3. CONFIGURATION

The Configuration & Monitor Utility is a powerful application that helps you to configure the WLAN PC Card and monitor the statistics of the communication. Unlike the standard method of configuring the card via the operating system utilities (e.g. Control Panel), this application permits the dynamic modification of configuration parameters while the card is operating. This application also offers more configuration options.

3.1 Under MS Windows 95/98/Me/NT/2000/XP

The Configuration & Monitor Utility appears as an icon in the task bar of Windows while the card is running (see Figure 3-1). You can open it by double-clicking on this icon. While the station is in infrastructure mode and not associated to an Access Point, the color of icon is red. As soon as the station is associated itself to an Access Point, the color of icon automatically turns to blue. In Ad-Hoc mode the color is always blue, except that it turns to red when the card is going through the reset and initialization procedure.

Figure 3-1 Configuration & Monitor Utility Icon

If you want to use the utility to configure wireless network settings in Windows XP, please click the "Properties" command (see Figure 3-2), and uncheck the "use Windows to configure my wireless network settings" (see Figure 3-3), then click "OK" button.

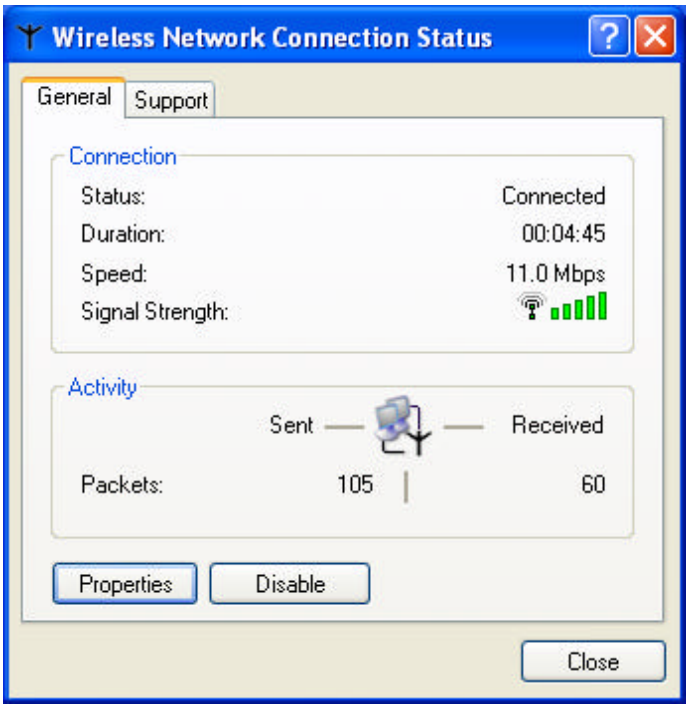

Figure 3-2 Wireless Network Connection Status

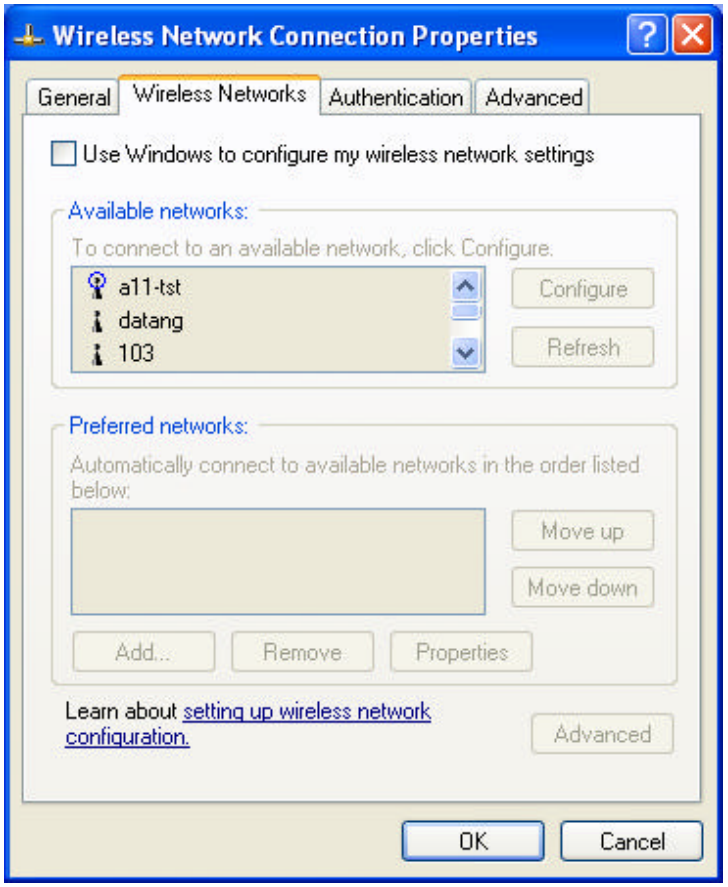

Figure 3-3 Wireless Network Connection Properties

The following options (tabs) are available for starting the application: Monitor, Statistics, Site Survey, Encryption, Advanced, Profiles, Info.

Monitor

A typical screen of the application in infrastructure mode is shown in Figure 3-4. The configuration parameters are shown on the screen from top to bottom (Operation Mode, Channel, SSID, Tx Rate, and Radio). In the middle of the screen there is information about the status of the communication (the BSSID of Access Point to which the card is associated, Signal Strength, and Link Quality). Press the “Change” button and make your changes, then press “ Submit” to save the changed configuration parameters.

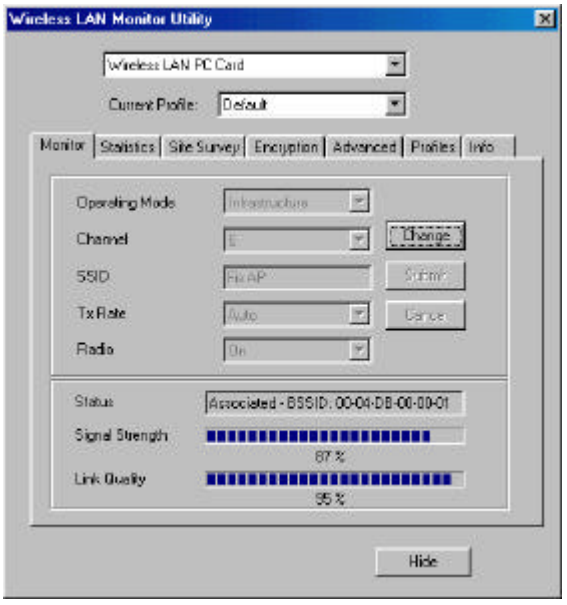

Figure 3-4 Monitor Utility in Infrastructure Mode.

Note: In Ad-Hoc mode, the Channel and SSID must be the same among stations so that the computers can communicate within the local LAN properly. Moreover, all connected computers should have the same netid and subnetid.

Statistics

This option enables you to view the available statistics information (Data packets, Management Packets and Rejected packets). Press the "Reset" button to renew or update this list of statistics. Press the "Exit" button at the bottom of the screen to exit.

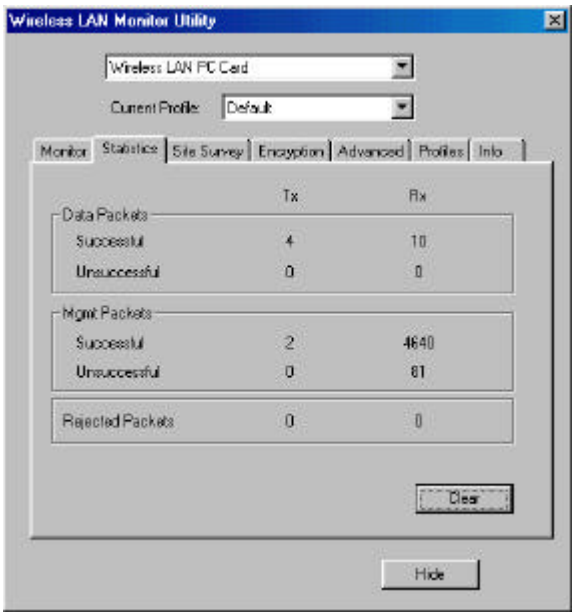

Figure 3-5 Statistic Information Available

Site Survey

By choosing the Site Survey option in any of the two modes, you can scan all the channels to find all the access points within the range of your card. In Figure 3-6, the card can see four access points. The list includes information about the BSSID and SSID of each access point and its signal strength, the channel where the access point operates, and whether WEP encryption is used. In order to update this list, press the "Re-scan" button. If you want to associate with any of the access point listed, double click on your choice (on the BSSID field), and the system will take you back to the Monitor screen that shows the parameters of newly established connection.

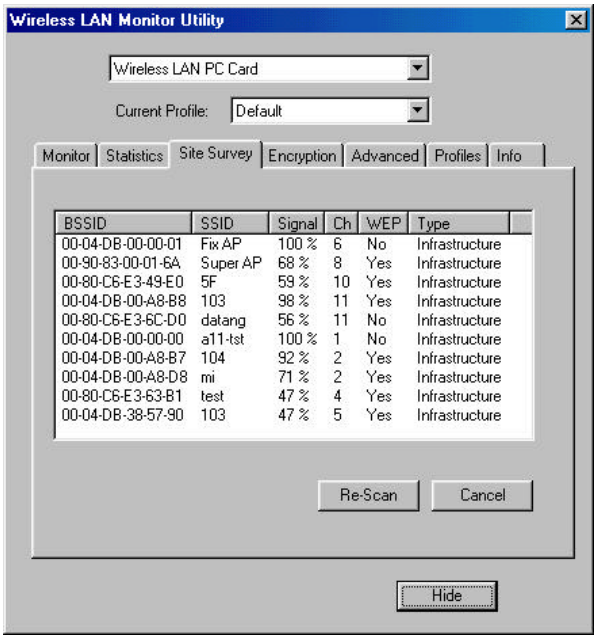
Wireless LAN Monitor Utility
Wireless LAN PC Card
Current Profile:
Default
Monitor
Statistics
Site Survey
Encryption
Advanced
Profiles
Info
BSSID SSID Signal Ch WEP Type
00-04-DB-00-00-01 Fix AP 100 % 6 No Infrastructure
00-90-83-00-01-6A Super AP 68 % 8 Yes Infrastructure
00-80-C6-E3-49-E0 5F 59 % 10 Yes Infrastructure
00-04-DB-00-A8-B8 103 98 % 11 Yes Infrastructure
00-80-C6-E3-6C-D0 datang 56 % 11 No Infrastructure
00-04-DB-00-00-00 a11-tst 100 % 1 No Infrastructure
00-04-DB-00-A8-B7 104 92 % 2 Yes Infrastructure
00-04-DB-00-A8-D8 mi 71 % 2 Yes Infrastructure
00-80-C6-E3-63-B1 test 47 % 4 Yes Infrastructure
00-04-DB-38-57-90 103 47 % 5 Yes Infrastructure
Re-Scan
Cancel
Hide

Figure 3-6 Site Survey Option

Encryption

By choosing this option in any of the two modes, you can set four different WEP keys and specify which one of them to be used. First, either enable or disable encryption from the appropriate "Encryption" field (see Figure 3-7). If encryption is enabled, you can choose any of the available WEP keys (1 to 4). If you select "Mandatory" from the WEP mode (Mandatory/Optional), then not only will WEP key be used, but also any other station needs to use WEP encryption in order to establish a communication with your station. This requirement is in line with the IEEE 802.11b standard. If, on the other hand, you choose "Optional", then your station can communicate with other stations regardless if they use WEP or not. Keep in mind that the WEP keys must be in HEX format. Finally, you have the option to select whether *Open System* or *Shared Key* authentication will be used. Press the "Submit" button at the bottom of the screen to take effect your changes.

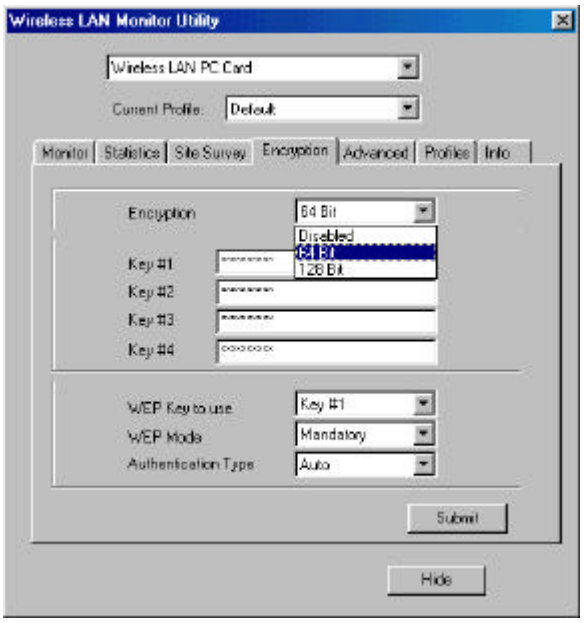

Figure 3-7 Encryption

Advanced

By choosing the Advanced option in any of the two modes, you can change advanced configuration settings, such as the Preamble Type, Fragmentation Threshold, and RTS/CTS Threshold (Figure 3-8). Figure 3-8 shows the recommended configuration for the advanced settings. Before selecting Short Preamble, make sure that the other stations and APs are also supporting this feature.

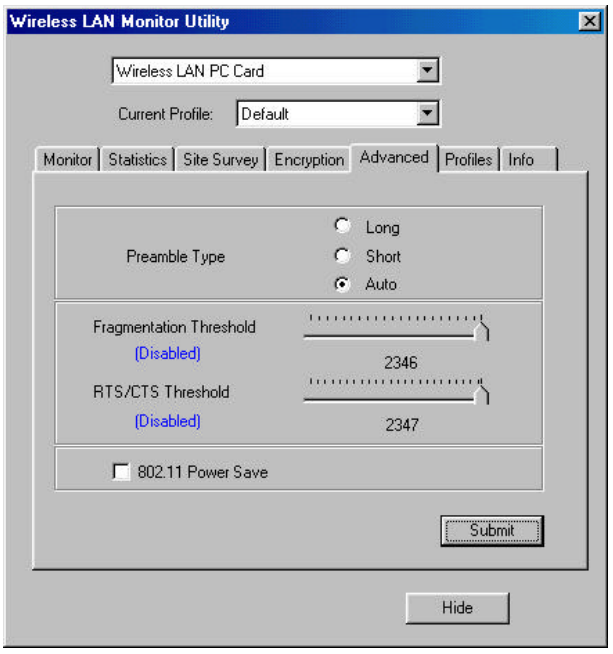

Figure 3-8 Advanced Settings

Note: The WLAN PC Card has an auto-detection feature therefore it automatically selects the Preamble Type depending on the Access Point Preamble type. Move the slide bars to enable the parameters of Fragmentation and RTS/CTS Threshold with your mouse and then use right and left arrow keys of your keyboard to select an exact number.

Profiles

By choosing this option, you can save your settings (SSID, Mode, Channel, Tx Rate…etc) here (Figure 3-9). You can use "New" command to create a new profile. If you want to modify the old profile, you must use ""Save" command to update the old profile. You can also use "Delete" and "Rename" commands to manage profiles.

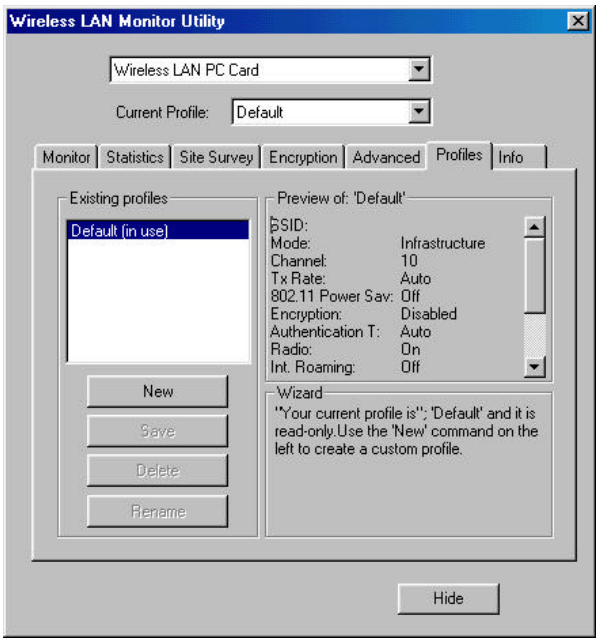

Figure 3-9 Profiles Settings

Info

By choosing this option, you can check the basic information about the Utility versions of Driver, Firmware and Application. Use the "Exit" button to exit the application.

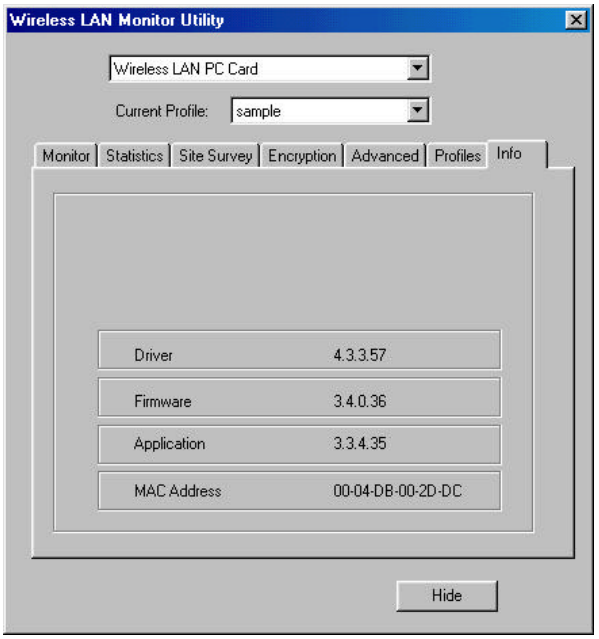

Figure 3-10 Information

3.2 Under MS Windows CE

The following options (tabs) are available for starting the application: Status, Encryption, Advanced, Version.

Status

A typical screen of the application in Ad-hoc Mode is shown in Figure 3-11. The configuration parameters are shown on the screen from top to bottom (Operation Mode, Channel, SSID, TxRate, Power Management Mode and MAC Address of the PC card). Press the "Change" button, make your changes and then press "Submit" to save the changed configuration parameters.

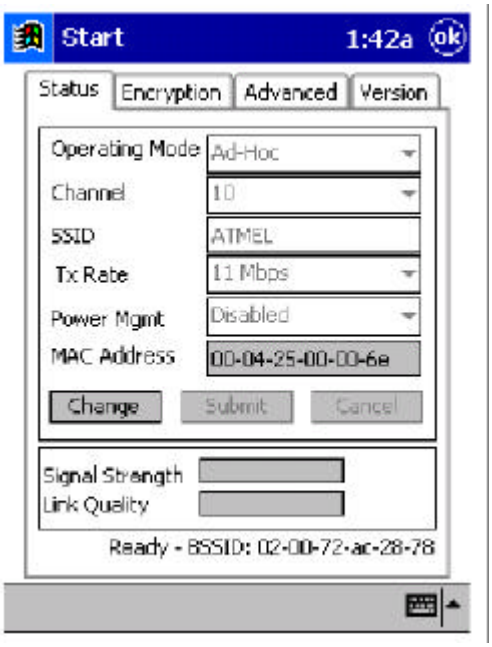

Figure 3-11 A Typical Screen of the Monitor Utility in Ad-hoc Mode

Encryption

By choosing this option in any of the two operational modes, you can set four different WEP keys and specify which one of them to be used. First, either enable or disable encryption from the appropriate "Encryption" field (see Figure 3-12 below). If encryption is used, you can choose any of the available WEP keys (1 to 4). You also have the option to select the WEP mode (Mandatory/Optional). If you select "Mandatory", then not only WEP will be used, but also any other station needs to use WEP encryption in order to establish communication with your station. This requirement is in line with the IEEE 802.11b standard. If, on the other hand, you choose "Optional", then your station can communicate with other stations regardless if they use WEP or not. Keep in mind that the WEP keys must be in HEX format. Finally, you have the option to select whether Open System, Shared Key, or Auto authentication will be used. Press the "Submit" button at the bottom of the screen to take effect the changes you wish to make.

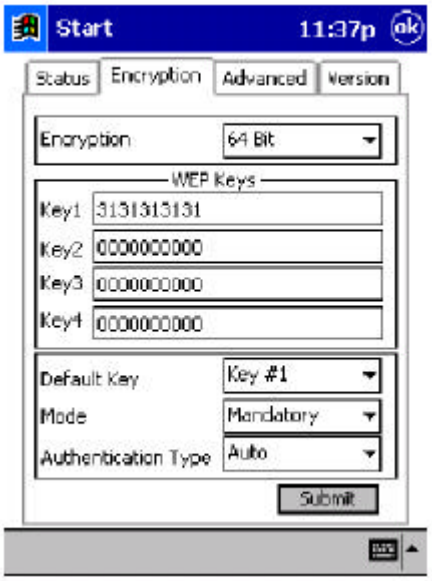

Figure 3-12 Encryption

Advanced

By Choosing the Advanced option in any of the two operational modes, you can change the advanced configuration settings, such as the Preamble Type, Fragmentation Threshold, and RTS/CTS Threshold (Figure 3-13). Figure 3-13 shows the recommended configuration for the advanced settings. The PC card has an auto-detection feature when selecting "Auto" for the preamble Type is selected.

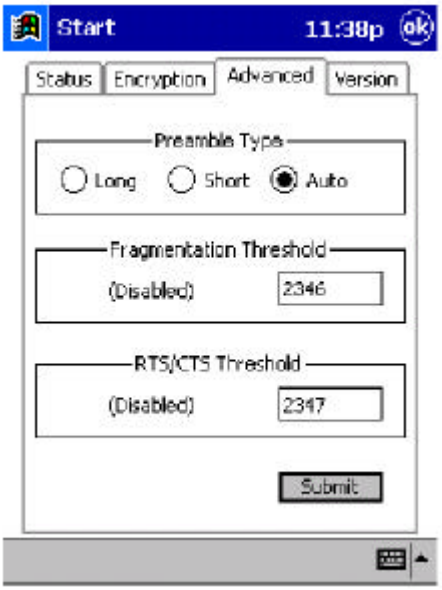

Figure 3-13 Advanced Settings

Version

By choosing this option, you can view the basic information about the Utility version of Driver, Firmware and Application (see Figure 3-14). Use the "ok" button (circled in top right corner) to exit the application.

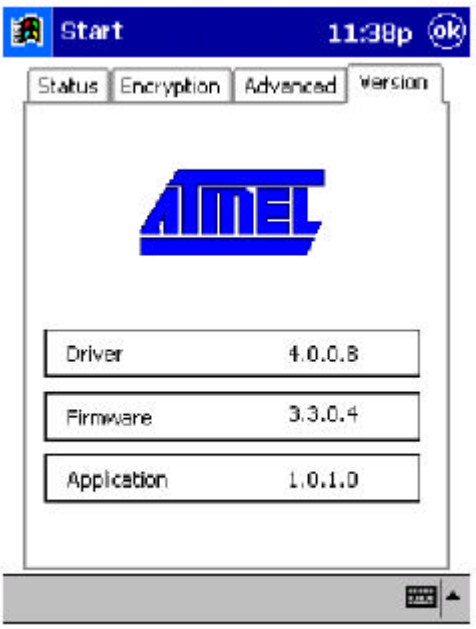

Figure 3-14 Version Information

4. SPECIFICATIONS

General	
Standard compliance	Compliant IEEE 802.11b Standard
Security	WEP 64-bit, 128-bit, encryption MD5
Hardware	
RF Range	Frequency range: 2.4 ~ 2.4835GHz
Data rate	11Mbps / 5.5Mbps / 2Mbps / 1Mbps
Modulation	DSSS (Direct Sequence Spread Spectrum)
	DBPSK/DQPSK
Coding	1, 2Mbps: 11 chip/bit Barker Coding
	5.5, 11Mbps: Complementary Code Keying
Number of channels	Europe: 13 (3 non-overlapping)
	US: 11 (3 non-overlapping)
	France: 4 (1 non-overlapping)
	Japan: 14 (3 non-overlapping)
Host Interface	PC Card 95 , PCMCIA type II 16 bit
Transmit power	+13dBm (Typ.)
Receive sensitivity	-83dBm (Typ.) for 11Mbps; -86dBm (Typ.) for 5.5Mbps; -89dBm (Typ.) for 2Mbps; -91dBm (Typ.) for 1Mbps (@BER 10E-5)
Software	
Driver Support	MS Windows 95/98/Me/NT/2000/XP/CE
Utility	User setup and diagnostic tool
Mechanical	
Dimensions	4.8” x 2.1” x 0.2”
Weight	1.2 oz.
Environmental	
Temperature	0 ~ 55°C (operation), -20 ~ +65°C (storage)
Relative Humidity	95% (non-condensing)
Certificate	
EMC	U.S.: FCC Part 15, sections 15.247, 15.205, 15.209
	Europe: ETS 300 328, ETS 300 826, CE Marked

5. GLOSSARY

The following glossary is for your reference only, and is not need for the installation of your Wireless LAN PC Card.

- Wireless Access Point (AP) – Any entity that has station functionality and provides access to the distribution services via the wireless medium (WM) for associated stations.
- Ad-Hoc – A network is composed solely of stations within mutual communication range of each other via the wireless medium (WM). An ad hoc network is typically created in a spontaneous manner. The principal distinguishing characteristic of an ad hoc network is its limited temporal and spatial extent. These limitations allow the act of creating and dissolving the ad hoc network to be sufficiently straightforward and convenient so as to be achievable by non-technical users of the network facilities; i.e., no specialized technical skills are required and little or no investment of time or additional resources is required beyond the stations that are to participate in the ad hoc network. The term ad hoc is often used as slang to refer to an independent basic service set (IBSS).
- BSS (Basic Service Set) – An AP associated with several wireless stations.
- ESS (Extended Service Set) – More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.
- Ethernet – A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.
- Infrastructure – The infrastructure includes the distribution system medium (DSM), AP, and portal entities. It is also the logical location of distribution and integration service functions of an extended service set (ESS). An infrastructure contains one or more APs and zero or more portals in addition to the distribution system (DS).
- IEEE – Institute of Electrical and Electronic Engineering
- LAN – Local Area Network
- Roaming – A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.
- RTS (Request To Send) Threshold – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this “Hidden Node Problem”.
- SOHO – Small Office Home Office
- SSID – Service Set Identifier
- Wired Equivalent Privacy (WEP) – The optional cryptographic confidentiality algorithm specified by IEEE 802.11 is used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network medium that does not employ cryptographic techniques to enhance privacy.